Dissolved Oxygen
Basin Plan Amendment
And
Total Maximum Daily Load
Comments for SJRGA, Prepared by LF Ploss

GENERAL

The Basin Plan Amendment (BPA) and supporting Total Maximum Daily Load (TMDL) report rely on the general hypotheses that three factors contribute to the Dissolved Oxygen (DO) impairment in the Stockton Deep Water Ship Channel (DWSC). The BPA concludes therefore that these same three factors are responsible for mitigation. The Regional Water Quality Control Board staff (RWQCB) determined that if any one of the three factors were addressed or mitigated for the DO impairment would not exist. Therefore the RWQCB concluded that the equitable way to address the DO impairment is for the three factors to be equally responsible. This has been defined as the "three-legged" stool approach of equally dividing the loading capacity of the DWSC into three equal parts to address DWSC geometry, flow entering the DWSC, and discharge of algal load and precursors from upstream sources.

The RWQCB in preparing the BPA acknowledges that the inter-relationship of the three factors cannot be defined and further studies will be needed. This points out the most significant error in the existing BPA of assigning responsibility in three equal parts for convenience and not based on scientific findings. This approach is further confounded in the RWQCB recommends implementation actions to address each factor. Without understanding the scientific inter-relationship among the three factors the required magnitude of any single solution cannot be determined nor can it be determined how the DO impairment within the DWSC will respond to any given implementation action.

DO or absence of DO is not a pollutant. 40CFR, Part 130 §130.2 defines pollution a man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water. Further loading capacity is greatest amount of matter or thermal energy that is introduced into a receiving water without violating water quality standards. The RWQCB has attempted to side step the conflict between absence of DO and the introduction of matter into the DWSC by addressing the assimilative capacity of the DWSC as being the problem. At this time the RWQCB is unable to determine the limiting volume of matter that may be introduced from upstream sources that diminish the assimilative capacity of the DWSC. In several instances throughout the BPA the RWQCB states that based on recommended studies and future findings subsequent TMDLs will be prepared. From this approach it is apparent the RWQCB understands that a DO impairment alone cannot be the subject of a TMDL. The RWQCB proposed in the BPA a phase implementation approach of studies and subsequent TMDLs. The reality is the BPA is not recommending a phase implementation to address the DO impairment but a phased imposition on unsuspecting parties to investigate and to define future regulatory actions.

SPECIFIC COMMENTS

Page 6, Para 1. Under Actions Recommended for Implementation by Other Entities the RWQCB does not identify the California State Lands Commission (CSLC). The CSLC has statutory jurisdiction over all sovereign lands within the state including the beds under all navigable rivers. As such the CSLC should be involved in actions regarding the use, disturbance, and future modification to the DWSC. The CSLC should be required to take the appropriate actions action against those parties responsible for altering the San Joaquin River channel.

Page 9, Para 1. In reviewing the supporting TMDL it is apparent that equitability was not a consideration in determining the responsibility of the three main factors. The assignment of responsibility is based on convenience and not on the understanding of scientific mechanisms and inter-relationships involving the three contributing factors.

Page 9, Para 3. The Loading Capacity equation does not recognize the background assimilative capacity of the system. In the TMDL determination of loading capacity the RWQCB has failed to recognize the assimilative capacity of the San Joaquin River between Channel Point and Disappointment Slough in the absence of man-inducted alterations that created the DWSC.

Page 10, Para 2 (#4.) The BPA and supporting TMDL fails to address the impacts associated with the past development of the DWSC. The Clean Water Act does not allow for such "grandfathering" of actions. The BPA, as well as past actions by the RWQCB staff, indicate a reluctance to seek full mitigation for the creation of the DWSC.

Page 15, Para 4 & Page 16 , top. The BPA describes the Tier 2 approach as "regulatory-based encouragement of management practices" to encourage adoption of management practices and agreements by waiving adoption of WDRs. Yet on page 16 the BPA is proposing no Tier Two or Tier Three actions until further studies as imposed upon apparent responsible parties are completed. This is not consistent with language elsewhere stating that the RWQCB will consider alternative mitigation measures. In fact through the RWQCB support DO-TMDL Steering Committee process the RWQCB has encourages a stakeholder assurance agreement for operating a demonstration aeration project with an in lieu of direct mitigation actions.

Page 24, Para 3. DO impairment is not a hindrance to the treatment of water for drinking water purposes and the implication that low DO is a drinking water issue is incorrect. The Plan states that the Delta provides drinking water to two thirds of the people in California. The Delta is the location for diverting water supplies used by the diverters for drinking water purposes. The source of the water diverted is from throughout the Central Valley of which the San Joaquin River accounts for approximately 19 percent of the inflow to the Delta.

Page 29, Top of Page. It is stated in the BPA that nitrogen compounds in the SJR are currently about 10 to 100 times higher than limiting values. What are the limiting values and how does this loading vary throughout the year in comparison to the DO concentrations in the DWSC? The referenced document (Lee and Jones-Lee, 2003) provided no additional information or basis for the statement. This is one of many instances where RWQCB used generalities or unsubstantiated statements in an effort to justify the severity of the problems and magnitude of the apparent causes.

Page 29, Para 1. This paragraph indicates that one question to be addressed deals with the relative impact of reduced flows from the three main eastside tributaries on algae concentrations. No specific reference is given to substantiate this statement. The reference that is given, Foe, et al., 2002 pg. 20-22 is in error. This particular reference to the Strawman Report is for a passage discussion change in concentration of organic material between Vernalis and Mossdale. The statement regarding flow contributions from the east-side tributaries are made in the Strawman Report (Foe, et al., 2002, pg. 7) that 62 percent of the metered summer flow at Vernalis originates from the these tributaries.

Page 30, Para 1. The BPA states that further study of animal wastes contribution to the DO impairment must be made. It should be reported that U.S. Geological Survey has reported that animal wastes in 2000 and 2001 represent a significant contribution to the impairment. (USGS 2004

Page 30, Para 6. "Using flow and organic loading data from 1999 and 2000, the model predicted no violations of the 5 mg/L DO water quality objective when natural SJR dimensions were used to replace the modeled DWSC geometry." This statement points to the difficulty of distributing the responsibility equally to the three main factors. If the responsibility were to be equally distributed this seems to indicate that if only one third of the DWSC geometry were replaced with SJR dimensions then the geometry factor is addressed and one-third the impairment removed. This condition or any other condition has not been evaluated by RWQCB to validate the hypotheses of the three-way split.

Page 31, Para 1. The same problem with assigning responsibility under the three-legged stool approach is obvious when the flow factor is discussed. "Data and studies show a strong relationship between reduced flows in the DWSC and low DO conditions in the DWSC." This relationship is only apparent if the remaining two legs are ignored therefore taking the leap that if flow is increased then no DO problem remains. But, how much must the flow increase? As stated by the RWQCB the inter-relationship of the three factors cannot be defined therefore the change in flow cannot be defined.

Page 31, Para 2. The statement of the fifteen-year moving average of the annual discharge in the late 1990's was approximately 800,000 acre-feet lower than in the late 1940's is not an accurate representation of the hydrologic condition of the watershed. The fifteen-year period ending in 1949 represented 5 wet years, 5 above normal years, 3 below normal year, and 2 dry years based on the unimpaired runoff for the San Joaquin valley. By comparison the fifteen-year period ending in 1999 represented 6 wet years, 1

above normal year, 1 dry year, and 7 critical years. The latter period included six consecutive years classified as critical. Irrespective of the reservoir operations and diversions taking place the runoff from the watershed would have been reduced. The final statement of the paragraph does not provide a basis for the analysis and represents information that is 24 years outdated with respect to the current situation of the DWSC.

Page 31, Para 3. The RWQCB twice makes reference to the change in average annual discharge between the 1940s and the late 1990s. It is not clear if the RWQCB is attempting to establish a baseline condition for flows or emphasizing the general trend in reduced flow at Vernalis. A reduction in summer time flows does not necessarily equate to lower DO in the DWSC. Further in the more recent years the flow at Vernalis has been managed to regulate for other water quality and environmental considerations such as salinity, Delta water quality objectives, and flows for salmon migration. The two paragraphs do point out that the RWQCB does not recognize the significant development that has taken place in the valley over nearly a 65 year period. Increased agricultural consumptive use is not the only cause. Out of basin diversions and expanding urban water use also contributes to the change in flow patterns. Reference to a 24-year old 1980 study reflects the use of out-dated data that does not indicate conditions as existing today.

Page 32, Para 1. The Plan indicates that between 50-90 percent of the SJR flow is diverted down the HOR. Based on a review of Figure 4-3 it appears that if SWP/CVP exports were adjusted in order to restrict between 80 and 200 CFS less flow from entering the HOR any portion of flow induced DO impairment would be addressed. This seems overly simplistic but does comport with the concept that flow is responsible for one-third of any excursion from the water quality objective.

Page 32, Para 3. The statement that the average allowable diversion capacity into Clifton Court Forebay will increase from 6,680 to 8,500 CFS is in error. Correctly stated the average daily diversion at Banks Pumping Plant is planned to increase from 6,680 CFS to 8,500 CFS. The maximum increase over short-term diversions into Clifton Court Forebay during high tide may be significantly greater. In fact, depending on the sequence of gate opening the short-term diversion may be two, three, or more times greater. The short-term diversion combined with the maximum diversion rate of 4,600 CFS at Tracy Pumping Plant coinciding with tidal induced reverse flow in the DWSC, may cause significant short-term DO excursions in the DWSC. Scientific studies have not been implemented to evaluate the effect of ever greater short-term DO excursions in the DWSC. Flow contributions from upstream of the HOR may provide little benefit when combined with such short-term flow fluctuations resulting from SWP/CVP export operations. Therefore the RWQCB cannot provide a general statement with any certainty that the flow factor equates to one third of the cause or for one third of the responsibility.

Page 33, Top Para. The main emphasis for increasing flow through the DWSC is to decrease the resident time oxygen consuming material within the DWSC. It should be stated that some reports raise concern that increase flow through the DWSC may

contribute to other water quality problems in the Central and South Delta. (G. Fred Lee, Summary of The Role of SJR DWSC Flow in Causing Low DO in the DWSC, September 15, 2003)

Page 34, Figure 4-3. A review of Figure 4-3 appears to indicate that at a flow over 750 CFS the average minimum concentration is 5 mg/L. Similarly at a flow of about 1,000 CFS the average minimum concentration is 6 mg/L. Therefore with everything else equal if the flow is increased by just 83 CFS the average DO concentration would increase from 5.0 mg/L to about 5.3 mg/L. The remaining responsibility would be that of DWSC geometry and upstream loading of material. It is highly unlikely this type of argument is correct yet this is the type of argument the RWQCB is putting forth.

Page 35, Equation 4-1. As was noted by Mr. Russ Brown, Jones & Stokes, during the April 12 public meeting this equation does not accurately represent the assimilative capacity of the DWSC. The equation should include a function to represent the re-aeration that occurs in the DWSC during the travel time from Channel Point to the location of the DO sag.

Page 37, Para 2. The margin of safety associated error rate of flow measurement of 20 percent is overly conservative. Between 2000 and 2004 the Vernalis Adaptive Management Program has coordinated reservoir operations on the three east-side tributaries with the flow on the San Joaquin River originating from upstream of the Merced River and with the daily accretions along the San Joaquin River in order to maintain an average daily flow at Vernalis over a 31-day period. The coordinated operation is in compliance with flow objectives prescribed in the water rights Decision 1641. This has been accomplished over the past five years with average daily flows being maintained within a planned plus or minus range 7 percent and often within less than 5 percent.

Page 37, Para 3. The RWQCB failed to describe the basis for a 20 percent margin of safety related to scientific uncertainty except for "professional judgment". Significant economic impacts will be imposed upon parties considered to be responsible for the DO impairment based on this inadequate justification. How the margin of safety applies to real-time management of the DO impairment is unknown and is most likely unnecessary.

Page 37, Equation 4-3. As commented above the RWQCB acknowledges a lack of understanding of the inter-relationship among loading of oxygen demanding material, DWSC geometry, and flow. It is speculative that the three contributing factors will be equal at all times. Removing DWSC geometry and flow from the loading capacity in order to determine the upstream TMDL is incorrect. Any reduction in loading capacity caused by the DWSC geometry and flow must be evaluated independently with the upstream load factor being DWSC geometry and flow dependent.

Page 39, top. The BPA refers to the work performed by Dr. Chen and referenced by Dr. Foe, et al, concluding that if the DWSC geometry was similar to the SJR then no DO impairment would exist. How this finding is transformed into the three-legged stool

approach is one of convenience not science. To extend this finding to the BPA implementation adds further confusion. For example, any necessary action to treat a DO impairment through an upstream load reduction and/or increase in flow would need to assume that one third of the DWSC was reconfigured to simulate the SJR. However an analysis has not been performed on the DWSC with one third of the geometry so modified. Similarly such analysis has not been performed for combinations of the two remaining factors.

Page 39, Equations 4-5 & 4-6. The two equations attempt to demonstrate that the loading capacity less the margin of safety can simply be divided into three equal parts. However, no analysis has been conducted to prove this hypotheses. The contribution from solving one factor simply cannot be determined by assuming the two remaining factors have been addressed. The interdependence of the three factors is highly variable. The RWQCB has not demonstrated the reliability of equations 4-5 & 4-6 to allow implementation to go forward.

Page 40, Para 1. The RWQCB states that progress in implementing the TMDL will not be measured against any baseline but rather controls will be imposed until such time as the DO objective is met. Without some baseline to measure the DO deficiency against no means is available to determine if any of the apparent responsible parties have applied the proper proportion of controls. Significant uncertainty exists in this approach and must be assumed in the analysis that any one party may be meeting the responsibility for the others.

Page 40, Para 3. A reference is made to Lee and Jones-Lee, 2003, pg. 63. This particular reference is to a 2003 Synthesis and Discussion on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel near Stockton, CA. This is a reference to a March 21, 2003 report prepared independently by the authors. The steering committee neither requested nor sanctioned the reference report and any indication of such should be removed. The DO-TMDL Steering Committee completed it's obligation to the RWQCB on February 4, 2003. The referenced report may or may not have been requested or sanctioned by the CALFED Bay-Delta Program but it must be noted the report has not received benefit of any independent science peer review consistent with CALFED practice and policy.

Page 41, Para 2. The BPA states in various sections that additional studies will be necessary to determine the quantity and to tally the amount of mitigation achieved by the various source controls. Yet, the RWQCB has concluded that 30 percent of the oxygen demand loading capacity be allocated to the Stockton RWCF. The 2002 Synthesis Report prepared under the direction of the DO-TMDL Steering Committee concluded that up to 50 percent of the loading capacity may be attributed to the RWCF and the 2003 synthesis report referenced by the BPA states up to 90 percent. Studies in late 2003 by Dr. G. Fred Lee indicate the range to be between 20-30 percent at a flow of 1,000 CFS through the DWSC and as high as 90 percent at a flow of only a few hundred CFS through the DWSC. It is not clear how any allocation to a single source can be definitively made while admitting that other such allocations cannot be made.

Unfortunately the RWQCB indicates this to be a "preliminary" allocation subject to modification in subsequent TMDLs. Significant uncertainty and economic consequences are imposed upon all apparent responsible parties based upon vague assumptions and reliance upon subsequent TMDLs.

Page 41, Para 3. The RWQCB summarizes the allocation of responsibility to the three main factors. The difficulty with such an allocation is that it cannot be implemented. We make the same argument here as elsewhere. It is acknowledged by the RWQCB that no scientific mechanism yet exists to define the proportionate responsibility share to any one main factor. Mitigation is confounded since no party can determine when a proper apportionate share is being met. Nor is it possible without a full understanding of the mechanisms involved to know how any single mitigation action related to other actions. Should a party assume that if the DO deficit is 3 mg/L then the correct mitigation to be applied is for 1 mg/L, equal to only one third of the excursion, or is it the full 3mg/L, or as stated on page 40; whatever controls are necessary until the objective is met?

Page 45, Para 3. The variability of the preliminary wasteload allocation to the Stockton RWCF should also recognize the efforts to address the geometry of the DWSC in addition to flow and temperature in the DWSC.

Page 46, top. The current CBDA grant for upstream studies does not include study efforts at the Stockton RWCF as suggested by the RWQCB. It is unlikely that study plans can be formulated, the required peer review completed, and approval obtained from the CBDA to meet the February 2005 deadline recommended by the RWQCB.

Page 46, Last Para. Similar to the comment above the current CBDA grant for upstream studies does not include study efforts for stormwater discharges as suggested by the RWQCB. It is unlikely that study plans can be formulated, required peer review completed, and approval obtained from the CBDA to meet the February 2005 deadline recommended by the RWQCB.

Page 48, Para 1. "Once adequate understanding of these linkages has been obtained, specific load allocations for algae and/or its precursors will be assigned to upstream sources by the CVRWQCB in a subsequent TMDL." Statements such as this throughout the BPA make it obvious that this plan is not to solve the DO problem in the DWSC but only to identify other potential regulatory actions that can be imposed. It is apparent from such statements that DO is an indicator, not a constituent to be subjected to a TMDL.

Page 48, Para 4. The RWQCB is taking the position that those responsible for the original creation of the DWSC cannot be held responsible for the solution. Yet some of the clearest studies to date indicate that if the man-made DWSC was simulated to appear as the upstream San Joaquin River then no DO problem would exist. Yet, the RWQCB appears reluctant to hold those responsible for the DWSC to mitigate for the problem.

Page 48, Para 4. No reference is made to the California State Lands Commission (CSLC) that has jurisdiction for the land under the DWSC. The CSLC was created in 1938 to protect the natural resources on public lands of the state including the land under all navigable rivers. The RWQCB should evaluate the jurisdiction of the CSLC and the responsibility of the USACE to mitigate for the DWSC.

Page 48, Para 5. Within the BPA the RWQCB appears to be limiting the USACE mitigation responsibility to actions identified as part of a Water Quality Certification under Section 401 the Clean Water Act. It appears that the RWQCB is reluctant to impose any responsibility against the USACE for actions prior to the adoption of the Clean Water Act. Such "grandfathering" of impacts does not appear to apply to upstream dischargers.

Page 50, Top. The BPA includes a recommendation that the SWRCB assign one-third of the responsibility through various water rights actions. It is unclear what justification exists to grandfather in the actions of the USACE while recommending broad-based water right actions against upstream diverters. How the one-third responsibility allocated to flow is to be defined or administered is unknown. As commented previously on Figure 4-3 the one third approach would require about 83.3 CFS to meet the flow obligation to increase the concentration from 5 mg/L to 6mg/L. Or is the alternative approach that as described on page 40 that water rights actions will be taken until such time as the DO objective is met irrespective of any other actions?

Page 51, Para 4. The statement is made that alternate mitigation measures may be needed if direct controls cannot successfully mitigate. Alternate mitigation should be allowed if direct controls are not reasonable or economically feasible. Any direct control can be successful if reasonableness or economic feasibility is disregarded.

Page 56, Para 3. In Consideration #3: Alternate Mitigation Measures the RWQCB has failed to discuss aeration of the DWSC as a method of meeting the DO objective. This is a significant oversight since considerable resources have been committed to evaluate the existing and future aeration potential.

Page 65, Para 6. Alternative I calls for immediate implementation of upstream load allocations based upon the best existing science and alternate mitigation when direct control is not deemed to be successful. The RWQCB has not met its responsibility under Water Code Section 13141 of defining the cost on the agricultural community. In Alternative I the cost question is side-stepped by stating any costs would be "speculative". Yet the cost to implement Alternative I by upstream dischargers would be very real and significant, not speculative. Nor does the RWQCB evaluate cost of alternate mitigation.

Page 66, Para 2. Alternative II is to implement upstream load allocations in a phase approach based upon new studies and implementation of alternate mitigation measures. The CEQA evaluation only includes the cost of studies under Alternative II. On page 43 of the BPA it is stated that "As the sources or oxygen demanding substances and their

linkages to the DO impairment are better understood, those sources linked to the DO impairment will be required to implement mitigation measures." The RWQCB fails to recognize the cost to implement direct control measures or any alternate mitigation, such as an aeration device.

Page 67, Para 1. Alternative III proposes to adopt the three-legged approach based upon the best available science along with alternate mitigation as necessary. The RWQCB has failed to meet its obligations under Water Code Section 13141 to identify the costs on the agricultural community for implementing Alternative III. These costs would include those of direct control, loss of water supply under a SWRCB action, and costs of alternate mitigation measures.

Page 68, Para 1. Alternative IV is similar to alternative III but proposes a phase approach using further studies such as those proposed under alternative II. The RWQCB has failed to meet its obligations under Water Code Section 13141 to identify the costs on the agricultural community for implementing Alternative IV. These costs would include those of direct control, loss of water supply under a SWRCB action, and costs of alternate mitigation measures.

Page 68, Para 4. The BPA estimates the cost to operate, maintain, and monitor an aeration device to be on the order of $200,000 per year. (Brown 2002). A more recent report by Jones and Stokes for the California Bay Delta Program, Evaluation of Aeration Technology for the Stockton Deep Water Ship Channel, January 2004, estimates a cost to be about $1,250 per day for providing up to 2,500 pounds per day of oxygen. Extrapolating this in order to provide up to the desired 1 millions pounds of oxygen per year the costs would be $500,000.